44. The DNA sequence as claimed in claim 43, which exhibits at least 70% homology to the sequence as shown in Fig. 12 or the complementary strand thereof and which codes for a polypeptide having the biological activity of the enzyme amorphadiene synthase.

45. The DNA sequence as claimed in claim 44, which is at least 80% homologous to the sequence in Fig. 12.

46. The DNA sequence as claimed in claim 43, which has the sequence as shown in Fig. 12.

47. The DNA sequence as claimed in claim 43, wherein the sequence has been isolated from plants producing amorpha-4,11-diene.

48. A method for producing amorphadiene synthase, comprising transforming or transfecting a host cell with the DNA sequence claimed in claim 43.

49. A DNA construct comprising the DNA sequence as claimed in claim 43 operably linked to suitable transcription initiation and termination sequences.

50. A host cell comprising a DNA sequence as claimed in claim 43.

51. The host cell as claimed in claim 50, wherein the cell is a bacterial cell.

52. The host cell as claimed in claim 50, wherein the cell is a plant cell.

53. The host cell as claimed in claim 52, wherein the cell is derived from a plant itself producing sesquiterpenes.

54. The host cell as claimed in claim 50, wherein the cell is a cell selected from the group consisting of *A. annua, V. oblongifolia* and *E. coli*.

55. The host cell as claimed in claim 53, wherein the cell is derived from a plant selected from the group consisting of the genera *Carum, Cichorium, Daucus, Juniperus, Chamomilla, Lactuca, Pogostemon* and *Vetiveria*.

56. The host cell as claimed in claim 52, wherein the cell is derived from a plant in which the biosynthesis of sesquiterpenoids can be induced by elicitation.

57. The host cell as claimed in claim 56, wherein the cell is derived from a plant selected from the group consisting of the genera *Capsicum, Gossypium, Lycopersicon, Nicotiana, Phleum, Solanum* and *Ulmus*.

58. The host cell as claimed in claim 52, wherein the cell is derived from a plant selected from the group consisting of soybean, sunflower and rapeseed.

59. The host cell as claimed in claim 50, wherein the cell is a yeast cell.

60. The host cell as claimed in claim 59, wherein the yeast cell is a cell selected from the group consisting of *Saccharomyces cerevisiae* and *Pichia pastoris*.

61. The host cell as claimed in claim 59, wherein the cell is an oleaginous yeast cell.

62. The host cell as claimed in claim 61, wherein the oleaginous yeast cell is a *Yarrowia lipolytica* cell.

63. The host cell as claimed in claim 50, which cell is part of a tissue or organism.

64. A transgenic tissue, consisting at least part of host cells as claimed in claim 50.

65. A transgenic organism, consisting at least part of host cells as claimed in claim 50.

66. A polypeptide having the biological activity of the enzyme amorphadiene synthase in isolated form obtainable by isolating the polypeptide from a plant selected from the group consisting of *A. annua* and *V. oblongifolia* by a process as described in Example 1.

67. A recombinant polypeptide having the biological activity of the enzyme amorphadiene synthase obtainable by expressing a DNA sequence as claimed in claim 43 in a suitable host cell as claimed in claim 50.

68. A method of preparing amorphadiene, comprising:

a) incubating a polypeptide as claimed in claim 67 in the presence of farnesyl pyrophosphate (FPP) in an incubation medium at a suitable temperature and during a suitable period of time; and

b) isolating the amorphadiene thus formed.

69. A method of preparing amorphadiene, comprising the steps of:

a) transfecting or transforming a suitable host cell with a DNA sequence as claimed in claim 43 to obtain transgenic host cells;

b) expressing the said DNA sequence in the presence of farnesyl pyrophosphate (FPP) to form amorphadiene; and

c) isolating the amorphadiene thus formed,

wherein the expression level of the amorphadiene synthase is higher in transgenic host cells, tissues or organisms harboring an endogenous version of the DNA sequence than in non-transgenic host cells, tissues or organisms.

70. A method of preparing artemisinin, comprising:

a) incubation of a polypeptide as claimed in claim 67 in the presence of farnesyl pyrophosphate (FPP) and the enzymes that further convert amorpha-4,11-diene to artemisinin in an incubation medium at a suitable temperature and during a suitable period of time; and

b) isolation of the artemisinin thus formed.

71. A method of preparing artemisinin, comprising:

a) transfecting or transforming a suitable host cell, tissue or organism with a DNA sequence as claimed in claim 43 to obtain transgenic host cells, tissues or organisms;

b) expressing the said DNA sequence in the presence of farnesyl pyrophosphate (FPP); and

c) isolating the amorpha-4,11-diene thus formed,

wherein the transgenic host cells, tissues or organisms harbor the genetic information coding for the enzymes that further convert amorpha-4,11-diene to artemisinin and wherein the expression level of the amorpha-4,11-diene synthase is higher in transgenic host cells, tissues or organisms harboring an endogenous version of the DNA sequence than in non-transgenic host cells, tissues or organisms.

72. A source of artemisinin, comprising host cells, tissues or organisms harboring a DNA sequence as claimed in claim 43 and the genetic information coding for the enzymes that further convert amorpha-4,11-diene to artemisinin, which host cells, tissues or organisms have expressed the said DNA sequence.

73. The source as claimed in claim 72, wherein the cells are cells selected from the group consisting of bacterial cells, yeast cells or plant cells.

74. The source as claimed in claim 72, wherein the cells are disrupted.

75. A transgenic cell, tissue or organism harboring in its genome more copies of a DNA sequence as claimed in claim 43 than are present in a corresponding non-transgenic cell, tissue or organism.

76. The transgenic cell as claimed in claim 75, which cell is an *E. coli* cell.

77. The transgenic cell as claimed in claim 75, which cell is a *Saccharomyces cerevisiae* cell.

78. The transgenic cell as claimed in claim 75, which cell is a *Yarrowia lipolytica* cell.

79. The transgenic organism as claimed in claim 75, wherein the organism is a plant itself producing sesquiterpenes.

80. The transgenic organism as claimed in claim 79, wherein the organism is an organism selected from the group consisting of *A. annua* and *V. oblongifolia*.

81. The transgenic organism as claimed in claim 79, wherein the organism is a plant selected from the group consisting of the genera *Carum, Cichorium, Daucus, Juniperus, Chamomilla, Lactuca, Pogostemon* and *Vetiveria*.

82. The transgenic organism as claimed in claim 75, wherein the organism is a plant in which the biosynthesis of sesquiterpenoids can be induced by elicitation.

83. The transgenic organism as claimed in claim 82, wherein the organism is a plant selected from the group consisting of the genera *Capsicum, Gossypium, Lycopersicon, Nicotiana, Phleum, Solanum* and *Ulmus*.

84. The transgenic organism as claimed in claim 75, wherein the organism is a plant selected from the group consisting of soybean, sunflower and rapeseed.

85. The DNA sequence as claimed in claim 44, which is at least 90% homologous to the sequence in Fig. 12.

86. The DNA sequence as claimed in claim 44, which is at least 95% homologous to the sequence in Fig. 12.--

<u>IN THE ABSTRACT</u>:

After the claims, please insert a page containing the <u>Abstract Of The Disclosure</u>, which is attached hereto as a separately typed page.